

shed of the Sok and Sheshma, and the Volga, as an island extending from north-east to south-west, and covered on its borders by mottled marls. The former is closely mingled with the latter, as it extends also in the shape of thinner intermediate deposits among the marls; but on the whole it substantially differs from them by its fauna, undoubtedly belonging to the Zechstein. As to the mottled marls, they contain the *Unio umbonatus*, Fisch., the *Estheria* sp. (*Posydonomia minuta*, Bronn.), the *Lingula orientalis*, Golowkinsky, scales of *Acrolepis macroderma*, Eichw., and Calamites. The Post-Pliocene deposits are spread everywhere, and we notice the find of Caspian shells of *Cardium*, together with *Dreissena*, at the sources of the Cheremshan river (left tributary of the Volga, namely, at Balandino, ten miles from the Cheremshanskaya fort). This important find proves thus that the Caspian formerly extended at least as far north as  $54^{\circ} 40'$  north latitude. As to the Permian formation to the west of Kazan, M. Krotoff, who includes in this formation both the Zechstein and the mottled marls, calculates that it has a thickness of 810 to 860 feet. Showing further that the fauna of the mottled marls but slightly differs from that of the Zechstein (a complete list of its fossils being given by the author), and that the fossils that are characteristic of these marls (*Unio umbonatus*, Fisch., *Unio castor*, Eichw., *Estheria* sp., *Cythere* sp., remains of fishes, and Calamites) were found elsewhere, either in company with purely Zechstein forms or in deposits subordinate to the Zechstein deposits, he concludes—perhaps too soon—that there is no ground to consider them as Triassic.

Anthropology and archæology are represented by several interesting papers:—M. Krotoff publishes his researches into the age of the stone implements found in the basin of the Oka, and M. Ivanoff on the Perm region.—M. Malieff publishes the results of his most interesting measurements of the Old Bulgarian skulls dug out from the Baby Bugor, at the Bulgarian village situated on the left bank of the Volga, close to Tetushi, and his paper is accompanied by sixteen photographs of four skulls. He measured the best preserved twenty-five skulls, all belonging to full-grown males. They are all much like one another, but could be subdivided into three groups: fourteen dolichocephalic, with indexes varying from  $71.4$  to  $77.1$ ; five mesatycephalic, their indexes varying from  $77.8$  to  $79.8$ ; and five subbrachycephalic, whose indexes vary from  $81.1$  to  $82.1$ . The average size of the horizontal circumference of the twenty-five skulls is 515 millimetres, with a maximum of 555 millimetres and a minimum of 490; the average capacity is 1381 cubic centimetres. They completely differ from the skulls of other inhabitants of the same region: not only Kalmuks, or Bashkirs, but also from the Russian, Tartar, or Mordovian skulls. Without expressing a definitive opinion until a comparison of these skulls with those of Bulgarians from the Balkan peninsula is made, the author points out that they are very much like those of the Koorgan inhabitants of the Government of Moscow, who seem to be Old-Sclavonic, and certainly are not Finnish, as results from an inquiry made on 120 skulls by Prof. A. Bogdanoff. They are similar also to the skulls of the old inhabitants of Kieff and to those of the Scythians of Southern Russia. M. Malieff's companion in these researches, who gives in the same periodical a sketch of the Old Bulgarian burying-place at Baby Bugor, adds that the skeletons they dug out had their heads towards the west, and were lying on the left side, looking towards the north (towards the Volga). Masses of pieces of earthenware were found together with the skeletons, and the pottery was of the roughest kind, made by hand, and burned very incompletely. He argues with much probability that this burying-place did not belong to a Mussulman people, but to idolaters, and supposes that its antiquity may be traced as far back as the Stone period. In any case, the customs of burying, as shown by this burying-place, seem to have been very much like those of the Sclavonians before their conversion. As to the burying-places at Chulpanovka and Ukrech, in the districts of Christopol and Laisher, explored by MM. Malieff and Vysotsky and described by the latter in his second "Anthropological Sketch of the Explorations of the Year 1880," and by M. Malieff in his just-mentioned paper, both explorers agree in considering them as belonging to Chuvashes. The craniological measurements which M. Malieff made on twenty skulls show that six of them belong to the mesatycephalic type, the average cephalic index of which is  $74.5$ , and the others are either dolichocephalic, or belong to women and children, or afford a most pronounced asymmetry, and cannot thus give reliable figures.

## UNIVERSITY AND EDUCATIONAL INTELLIGENCE

THE *alumni* and other friends of the University of St. Andrews have been roused to action by the threat (now withdrawn) of its possible dissolution, in consequence of insufficient endowment. An "Appeal" which has just been issued shows that 2700*l.* (in sums of from 100*l.* to 1000*l.*) has been already subscribed towards the better endowment of the Professorial Chairs; and a scheme has been set on foot amongst the younger graduates for the no less essential object of securing the augmentation of the open bursaries. Upwards of 200*l.* (in sums of from 1*l.* to 50*l.*) has been already promised towards this special fund, and an appeal from the Committee appointed for this purpose will shortly be circulated. There is good reason to believe that the withdrawal of the obnoxious clause has been partly occasioned by the practical shape which the defence of the oldest Scottish University has thus assumed.

## SCIENTIFIC SERIALS

THE *American Journal of Science*, June, 1883.—On the nature of the induration in the St. Peter's and Potsdam sandstones and in certain Archæan quartzites, in Wisconsin, by R. D. Irving. The author extends the conclusions already arrived at by Sorby in several important respects.—On the existence of a deposit in North-Eastern Montana and North-Western Dakota, that is possibly equivalent with the Green River group, by Charles A. White. The paper embodies a detailed description of the new extinct genus and species of Percidæ occurring in the Dakota rocks, by Prof. E. D. Cope.—On the peculiar concretions occurring in meteoric irons, by J. Lawrence Smith. These concretions are found to contain sulphuret of iron, schreibersite (phosphuret of iron and nickel), graphite, daubréelite, chromite, lawrencite, aragonite.—On mineral vein formation now in progress at Steamboat Springs compared with the same at Sulphur Bank, by Joseph Le Conte.—Observations on the transit of Venus, December 6, 1882, at the Vanderbilt University Observatory, Nashville, Tennessee, by Olin H. Landreth.—On the fauna found at Lime Creek, Iowa, and its relation to other geological fauna, by S. Calvin. A complete catalogue is given of the Lime Creek fauna which are compared with those of the Niagara, Cinderhook, and other Devonian rocks.—Observations on stratified drift in Delaware, by F. D. Chester.—On the western discharge of the flooded Connecticut, or that through the Farmington Valley to New Haven Bay, by James D. Dana.—Results of some experiments made to determine the variations in length of certain bars at the temperature of melting ice, by R. S. Woodward, E. S. Wheeler, A. R. Flint, and W. Voigt. The experiments are chiefly made with zinc and steel bars, and the authors found that zinc is the least reliable metal for the components of a metallic thermometer and standard of length, while steel, copper, and brass do not vary appreciably at any ordinary temperature.—On Scovillite, a new phosphate of didymium, yttrium, and other rare earths, from Salisbury, Connecticut, by George J. Brush and Samuel L. Penfield.

*Journal of the Royal Microscopical Society* for April, 1883, contains:—On five new Floscules, with a note on Prof. Leidy's genera, *Acyclus* and *Dictyophora*, by Dr. C. T. Hudson (Plates 3 and 4).—The President's (Prof. P. M. Duncan) address.—The action of tannin on the cilia of Infusoria, with remarks on the use of a solution of sulphurous oxide in alcohol, by H. J. Waddington.—Summary of recent literature.—Proceedings of the Society.

*Journal of the Russian Chemical and Physical Society*, vol. xv. fasc. 4.—On solutions, by W. Alexeyeff; being an inquiry into the mutual solutions of liquids, as depending upon temperature. The experiments carried out on aniline, amyl and isobutyl alcohols, phenol, &c., lead to the following conclusions:—The hypothesis of Person as to the liquefaction of bodies before solution is not confirmed. The solubility depends upon the molecular cohesion, and increases as this last becomes feebler. Thus, at the same temperature, more of liquid than of solid salicylic acid is dissolved. The solutions are quite different from chemical compounds, and the liquid mixtures are different from solutions.—On the specific volumes of elements in liquid compounds; second paper, by M. Shalfeyeff. The conclusions of these valuable researches are:—The compounds of the fat series are derived from the uneven-atomic carbon; and those of the

aromatic series from the even-atomic carbon. The specific volume of carbon is  $C = 21$  in the  $C_nH_{2n}$  compounds of the former series, and  $C = 12$  in the  $C_nH_{2n}$  compounds of the second series.—On Caucasus naphtha, by M. W. Markovnikoff and W. Ogloblin, being a thorough analysis of it.—On the identity  $(\sum a_i x_i^2) \sum a_i = (\sum a_i x_i)^2 + \sum a_i a_i (x_i - x_i)^2$ , and its meaning in physics, by N. Slouguinoff.—On the focal properties of diffraction-nets, by M. Merching.—On the specific properties of indiarubber, by N. Hesehus. They cannot be explained by the presence of air vehicles.

To the *Bulletin of the Belgian Académie Royale des Sciences*, for 1883, part 2, M. C. Malaise sends a valuable paper on the constituent elements of the Silurian formations of Brabant. An approximate thickness of 12,000 or 14,000 feet is assigned to the various groups constituting the older schistose rocks of this province.—Ed. Dupont deals with the origin of the Belgian Carboniferous limestones; and papers are contributed by M. Terby on the aspect and positions of the great comet of 1882; by M. Chevron, on the inflammable nature of the gases liberated in the decomposition of beetroot; by Baron Kervyn de Lettenhove, on the Conference of Bayonne of 1565; by Alphonse Waterson, on the origin and rise of the early Flemish school of painting previous to the Van Eycks.—Part 3 contains contributions by J. de Tilly, on Chasles' theorem of central axes; by Ed. Van Beneden, on some additions to the ichthyological fauna of the Belgian seaboard; by M. Genocchi, on the algebraic functions of Prymand Hermite; by Joan Bohl, on the reforms recently introduced into the commercial jurisprudence of Italy.

*Rendiconti of the Reale Istituto Lombardo di Scienze e Lettere*, April 12, 1883.—Some applications of symbolic variability to mechanical problems, by S. C. C. Formenti. This paper is concluded in the next number, April 26.—On springs, head streams, and underground currents in the Italian Alps, by Prof. T. Taramelli.—Experimental researches on the decomposition of adipose substances in water, in damp earth, damp rooms, and in water charged with 10 per cent. of ammonia, by C. A. Tamassia.—A study of microscopic organisms in sweet, salt, and mineral waters, by Prof. L. Maggi.—Remarks on the equivalence of magnetic and galvanic distributions, by Prof. E. Beltrami.—A preliminary inquiry into Zanardelli's proposed Italian penal code, by Prof. A. Buccellati.—On an unpublished letter of Francesco Maurolico, dated September 11, 1571, in connection with the battle of Lepanto, by L. De-Marchi.—On an example of realism in classic art, by Prof. J. Gentile.

April 26.—A comparative study of the arachnafauna of Abyssinia and Shoa, by Prof. Pietro Pavesi. The author determines thirty new species of spiders, for one of which (*Chiasmopes*) he establishes a new order.—On the determination of the coefficients of specific force for iron independently of Wöhler's numbers, by Prof. C. Clericetti.—Suggestions on a substitute for capital punishment in Zanardelli's new Italian penal code, by Cesare Oliva.—Remarks on banking and the cheque system introduced into the new Italian commercial code, by L. Gallavresi.

*Atti of the Roman Reale Accademia dei Lincei*, April 1.—On Finlay's comet (1882), by S. Respighi.—On the first observer of the optical illusion converting convex into concave and concave into convex surfaces, by S. Govi. The priority of discovery usually assigned either to Joblot (1718) or to Christopher Cock (1688) is here credited to Eustachio Divini (1663) on documentary evidence.—On the presence of native cinabar and sulphide of silver in the Tolfa Hills, by S. Blaserna.

April 15.—Biographical notice of the late Bertrando Spaventa, by S. Ferri.—On the migrations of the ancient peoples of the Armenian Highlands and Asia Minor, studied in the light of the Egyptian monuments and hieroglyphical inscriptions, by S. Fiorelli.—A notice of the archaeological discoveries made in various parts of Italy during the month of March, by S. Fiorelli.

*Revue internationale des Sciences biologiques* for March, 1883, contains:—On the origin of the vertebrates and the principle of the transformation of functions, by Dr. A. Dohrn.—On the excitability of plants, by Dr. Burdon Sanderson.—On dwarfs and giants, by D. L. Delboeuf.—Proceedings of the Academy of Sciences, Paris, of the Belgian Academy, and of the Academy of Amsterdam.

April, 1883, contains:—On the primordial flora, by Louis Crié.—On the origin and relation of sex, by M. Debievre.—On colour and mimicry in insects, by Dr. Hagen.—Proceedings of the Academy of Sciences, Paris, and the Academy of Sciences, Amsterdam.

## SOCIETIES AND ACADEMIES LONDON

**Royal Society, May 10.**—"Note on the Motor Roots of the Brachial Plexus, and on the Dilator Nerve of the Iris." By David Ferrier, M.D., LL.D., F.R.S., Professor of Forensic Medicine in King's College.

In a communication to the Royal Society (published in the *Proc. Roy. Soc.*, vol. xxxii. 1881) on the "Functional Relations of the Motor Roots of the Brachial and Lumbo-Sacral Plexuses," my colleague Prof. Gerald Yeo and myself gave an account of the results of electrical stimulation of the several motor roots of the brachial and crural plexuses in the monkey. We there described the muscular actions of the upper extremity as resulting from stimulation of the first dorsal up to the fourth cervical nerve.

The careful dissections made at our request by Mr. W. Tyrell Brooks, Demonstrator in the Physiological Laboratory, King's College, and a repetition of the stimulation experiments which I have made, have revealed an error in the enumeration of the roots of the brachial plexus which, in common with Prof. Yeo, I wish to correct. What we took for the first dorsal nerve has proved in reality to be the second dorsal. Hence the results of the experiments must be read as applying to the spinal nerves from the second dorsal to the fifth cervical respectively, instead of from the first dorsal to the fourth cervical, as stated in our paper.

The anterior division of the second dorsal nerve in the monkey apparently invariably gives a well-developed communicating branch to the first dorsal, besides giving off the second intercostal nerve and a branch to the stellate or inferior cervical ganglion of the sympathetic.

The three branches, as seen in a dissection made for me by Mr. Brooks seem pretty equal in size, and all come off from the main trunk together.

The brachial plexus in man is not usually, in text-books of anatomy, considered as deriving any of its component roots below the first dorsal. In "Quain's Anatomy" (ninth edition, p. 619), however, a branch from the second to the first dorsal is given as a variety. On this subject Dr. D. J. Cunningham has published a note in the *Journal of Anatomy and Physiology*, vol. xi. part iii., p. 539, 1877. Dr. Allen Thomson having mentioned to him that he had on one or two occasions seen such a communicating branch in man, he investigated the point, with the result of finding a communicating branch from the second to the first dorsal in twenty-seven out of thirty-seven dissections. Of the ten cases where it was not found, five were so complicated by previous interference in the dissecting-room or by pleuritic adhesions and thickenings, that they may be considered as doubtful. But, even including these, it appears that the second dorsal sends a communicating branch to the first in 73 per cent. of the cases. Hence it should be considered as more than a mere variety. If a perfect homology exists between the roots of the plexus in man and the monkey, the second dorsal root would be the one presiding over the intrinsic muscles of the hand. Presumably in those cases where it is not found, its functions are represented in the first dorsal.

*Dilator Nerve of the Iris.*—Prof. Yeo and I mentioned in our paper (*sup. cit.*) that in one case in which we directed special attention to the pupil, stimulation of the anterior roots from the first dorsal to the fourth cervical—in reality from the second dorsal to the fifth cervical—caused no change in the pupil, though the movements of the limb occurred with regularity.

I have since investigated this point during the course of another research on which I have been for some time engaged. I have experimented on four monkeys. The animals were thoroughly narcotised with chloroform and kept so during the whole course of the experiments. The posterior roots of the nerves under investigation were cut, and the anterior stimulated within the vertebral canal with a weak induced current from the secondary coil (distant 20 to 15 cm.) of a Du Bois Reymond's magneto-electromotor and one Daniell. As in former experiments, a large flat electrode was placed on the sacrum as a neutral point, the exciting electrode being a hooked needle, by means of which the roots could be easily insulated and separately stimulated.

In the first experiment I failed to obtain dilatation of the pupil from stimulation of the spinal roots from the second dorsal up to the fourth cervical, though the functional activity of the roots was indicated by movements of the limb. In the second I exposed the dorsal roots from the eighth up to the third in-